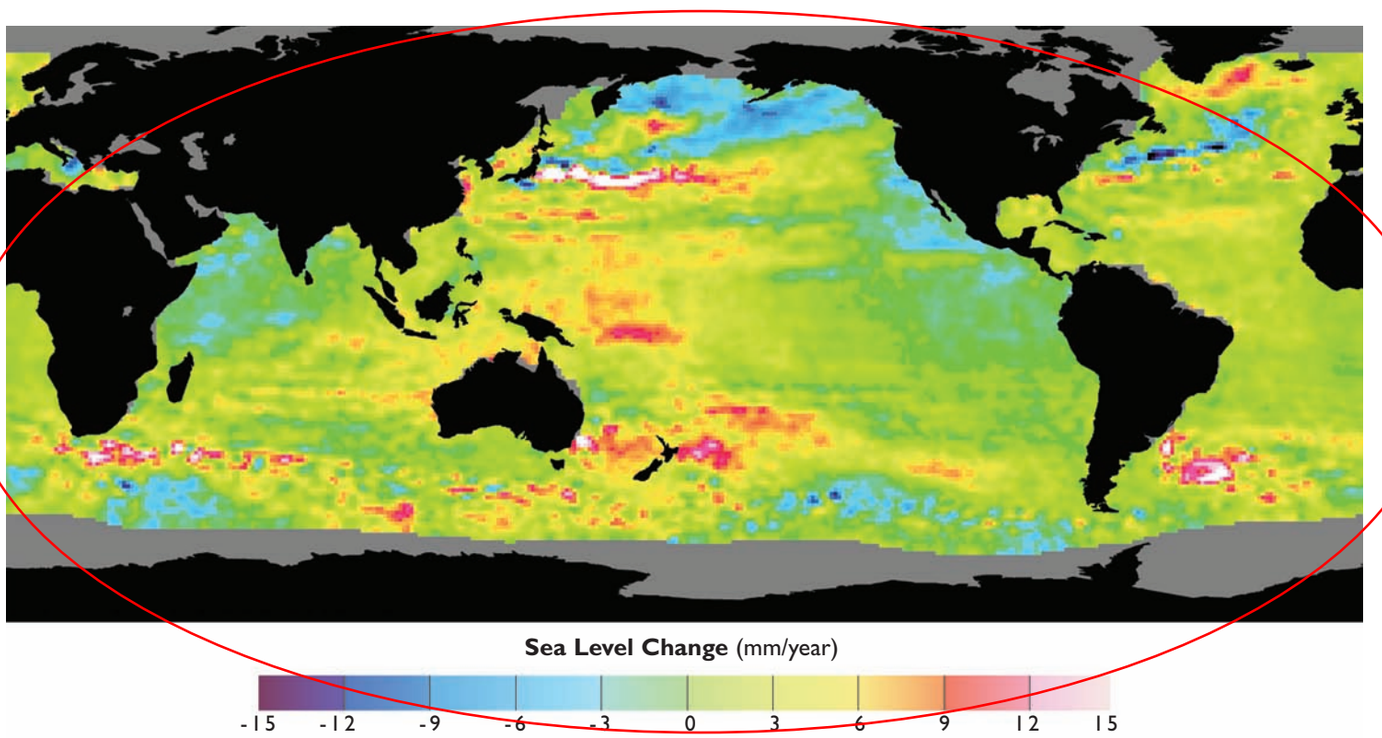
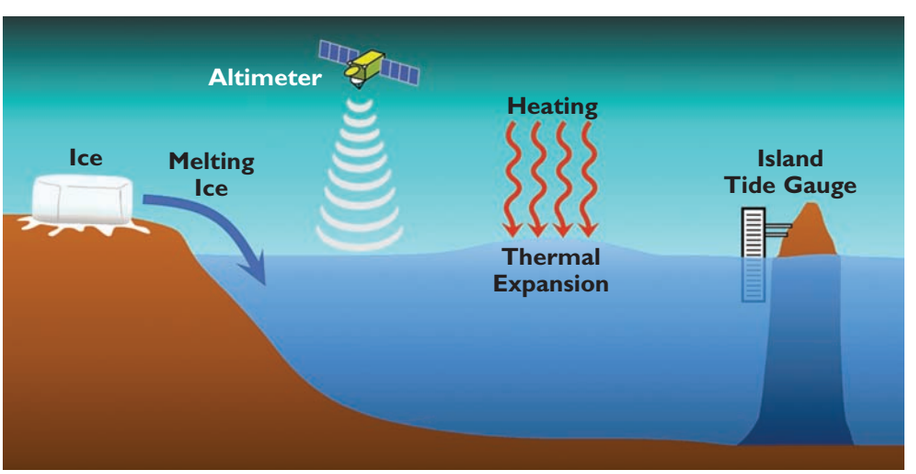
Sea Level Rise

GARY T. MITCHUM
R. STEVEN NEREM



Secular sea level change over 1993–2004 from a combination of TOPEX/ Poseidon and Jason satellite altimeter data.

Human activities are changing the face of our planet in many ways. We know, for example, that the burning of fossil fuels is increasing carbon dioxide levels in our atmosphere, and we have good evidence that the atmosphere is slowly warming as a consequence. But the long-term ramifications are not entirely clear, and are presently the subject of much debate. If our climate is indeed warming, sea level rise is widely considered to be an unavoidable consequence. This is obviously of direct importance to human beings, as it has been estimated that over one third of us live within 100 kilometers of the coastline.



Sea level changes. These changes reflect changes in the global ocean volume—higher sea level means that the ocean volume has increased. There are two primary ways in which the ocean's volume can be changed. By melting ice that sits on land we can increase the amount of water in the ocean. Also, if we warm the waters in the ocean, the volume will increase because warm water is slightly less dense than cool water and therefore takes up more space. We now have two primary ways of observing these sea level, or volume, changes. These are tide gauges attached to the land, or satellite altimeters orbiting the Earth. (Graphic prepared by C. Edmisten, University of South Florida.)